AN AQUATIC SPITTLE BUG (HOMOPTERA: CERCOPIDAE) FROM A *HELICONIA* FLOWER BRACT IN SOUTHERN COSTA RICA[1,2]

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ABSTRACT: An immature aquatic spittle bug was found inhabiting a water-filled flower bract of an unidentified wild plantain *Heliconia* sp. in southern Costa Rica. An enclosed ventral air tube used by terrestrial forms to aerate spittle enables this aquatic form to remain completely submerged in water with only the posterior tip of the abdomen reaching the surface for gas exchange. Cryptic coloration suggests that it may be an obligate inhabitant of water-filled *Heliconia* flower bracts.

DESCRIPTORS: Aquatic spittlebug, *Heliconia*, phytotelma

While surveying aquatic insects inhabiting the water-filled flower bracts of wild plantain, *Heliconia* sp., at the Las Cruces Botanical Garden near San Vito de Java in southern Costa Rica, I found a large immature spittle bug. The insect was completely submerged in the estimated 50 ml of rain water contained in the bract with only the posterior extremity of its abdomen reaching the water surface (Fig. 1). When the insect was removed from the bract and kept in a pan of water ranging in depth from 0 to 2 cm for several days, it remained submerged in the same manner as observed while in the flower bract.

The specimen measured 18 mm in length and 6 mm in width at the thorax. The abdomen and thoracic sclerites were bordered in red as were the distal ends of each leg and antennal segment. With the exceptions of dark wing pads (indicating a late nymphal instar) the remainder of the cuticle was a faint yellowish orange color and almost transparent. (Fig. 2).

Unfortunately my departure from Las Cruces prevented efforts to rear the specimen to maturity. Consequently it was preserved in alcohol precluding an identification in the absence of keys to the immature Ceropidae, and has been deposited in the Florida State Collection of Arthropods.[4]

The large colorful bracts of many *Heliconia* species effectively impound rain water providing the developing flowers with an aquatic medium (Fig. 3). Typically, 15 to 20 flowers were developed in sequence within each bract.

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Each flower lasts but one day and senescent flowers decompose in the bract water (Stiles, 1975). Skutch (1933) states that the floral structures of *Heliconia* resemble those of truly aquatic plants and suggests that the aquatic micro-habitat provided by the bracts may protect the flowers from destructive insects. However, a variety of aquatic organisms have been found inhabiting *Heliconia* flower bracts. Seifort (1974, 1975) reported 6 species of aquatic insects (Coleoptera: 2 sp.; Diptera: 4 sp.) regularly inhabiting *Heliconia* inflorescences in the Osa Peninsula of Costa Rica. He observed that some species fed on decaying flower parts while others attacked the living

Figure 1. Aquatic cercopid submerged in the water of a *Heliconia* flower bract.

Figure 2. Aquatic cercopid removed from the flower bract is seen here submerged in a petri dish of water.

Figure 3. Inflorescence of the unidentified *Heliconia* in which the aquatic cercopid was found.

flowers. In addition, Maguire *et al.* (1968) reported 2 other dipterous species as well as copepods, ostracods, and protozoa living in the bracts of *Heliconia* in Puerto Rico.

The cercopid here reported presumably feeds on the vascular tissue of the thick flower bracts since it has typical homopteran mouthparts. Many situations in the tropics could conceivably provide suitable habitat for an aquatic homopteran considering the abundance of plant-contained ponds (phytotelmata) such as bromeliads, leaf axils of certain Araceae, and flower bracts of *Heliconia.* However, this insect may be restricted to *Heliconia* as its red markings are suggestive of cryptic coloration: Most *Heliconia* flower bracts are bright red, an adaption to hummingbird pollination (Stiles, 1975).

Kershaw (1914) described the respiratory system of immature Cercopidae. The pleural sclerites are extended ventrally over the sternal sclerites enclosing them to form an air tube the length of the abdomen. This abdominal air tube is open at the posterior end allowing gas exchange with the lateral spiracles on each abdominal segment. It is by means of this specialized air tube that terrestrial immature spittle bugs aerate anal secretions to produce large amounts of the familiar spittle (Gahan, 1918).

The respiratory modifications of the insect found in *Heliconia* bracts were essentially the same as those described by Kershaw (1914) for terrestrial forms. Thus, immature spittle bugs appear to be pre-adapted to plant associated aquatic habitats as an alternative to a terrestrial existence enveloped in protective anal secretions. Respiration through a posterior air tube in contact with the water surface is a recognized adaptation to an aquatic environment found also in immature mosquitoes and water scorpions. The discovery of an aquatic form in the order Homoptera is an addition to the 10 insect orders that Usinger (1971) recognized as having aquatic forms.

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